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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,720	06/19/2001	Richard R. Hengst	6096-01	2520
26614	7590	06/02/2004	EXAMINER	
PEPE & HAZARD, LLP 225 ASYLUM ST. HARTFORD, CT 06103			KACKAR, RAM N	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/884,720

Applicant(s)

HENGST, RICHARD R

Examiner

Ram N Kackar

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-6,9,11-16,29,30 and 32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,9,11-16,29,30 and 32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6, 11-15, 29-30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richard R Hengst (US 5931666) in view of Lu et al (US 5904778).

Hengst et al disclose a vertical wafer boat with plurality of support rods for supporting plurality of silicon wafers having ceramic body of SiC or recrystallized SiC (Col 2 line 60), having ceramic coating of SiC to prevent migration of impurities (Col 5 line 32-45) and surface roughness to prevent slip of less than 1  $\mu\text{m}$  (Col 4 lines 14-22), horizontal base, top plate, support rods, plurality of slots, each having ceramic coating and surface finish (Fig 1).

Hengst et al disclose ceramic coating of silicon carbide but do not disclose its thickness.

Lu et al disclose SiC coating on sintered Silicon carbide being 100 $\mu\text{m}$  or less (Col 6 line 21-23).

Therefore it would have been obvious for one having ordinary skill in the art at the time invention was made to have a thickness of less than 100 microns because too thick a layer may have a tendency to peel and too thin layer may not provide adequate protection.

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3. Claims 1-6, 9, 11-15, 29-30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inaba et al (JP 11016993) which later became (US Patent 6093644) in view of Lu et al (US 5904778).

Inaba et al disclose a vertical wafer boat for supporting silicon wafers having ceramic body (Fig 1 and Col 1 line 34) having ceramic coating to prevent migration of impurities (Col 1 line 20) and surface finish over the coating to prevent slip in substrates of large diameters (Col 1 line 20) and at high temperature (Col 1 line 13), maximum roughness of the finish less than 10  $\mu\text{m}$  and an impurity of less than 0.1 ppm (Col 3 line 14 and 15), horizontal base (Fig 1-13), top plate (Fig 1-12), support rods (Fig 1-11) and plurality of slots (Fig -14), each having ceramic coating and surface finish (Col 2 line 47).

Inaba et al disclose ceramic coating of silicon carbide but do not disclose its thickness.

Lu et al disclose SiC coating on sintered Silicon carbide being 100 $\mu\text{m}$  or less (Col 6 line 21-23).

Therefore it would have been obvious for one having ordinary skill in the art at the time invention was made to have a thickness of less than 100 microns because too thick a layer may have a tendency to peel and too thin layer may not provide adequate protection.

4. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inaba et al (JP 11016993) which later became (US Patent 6093644) or Richard R Hengst (US 5931666) in view of Larry S Wingo (US 6171400).

Inaba et al or Richard R Hengst both, disclose a vertical wafer boat for supporting silicon wafers having ceramic body but do not disclose a stress relief slot and location notch.

Wingo discloses wafer boat having both stress relief slot and notches at the base (Fig 1).

Therefore it would have been obvious for one having ordinary skill in the art at the time invention was made to use the teaching of Wingo so as to be able to avoid problems due to thermal expansion and be able to place the boat correctly on processing platform.

***Response to Amendment***

Applicant's arguments filed 5/6/2004 have been fully considered but they are not persuasive.

The applicant argues that Lu et al is directed to an entirely different technology, namely silicon carbide components utilized in single wafer etching chambers for semiconductor processing.

As discussed in the rejection, the issue of protective film thickness must be analyzed in view of the fact that for adequate protection, the film should have at least a minimum thickness. This applies to any type of protection since one of ordinary skill would be aware that too thick films are likely to have adherence problem. Actual minimum thickness needed would therefore depend upon the range of process variables for which the equipment is designed. This type of optimization would be a routine for one of ordinary skill in the art.

The applicant repeats the argument made earlier about the commercial success of the product incorporating the invention. As again, the applicant fails to provide any quantitative data in support of this assertion.

Secondly, even if it is agreed that there was some commercial success its nexus to the claimed invention has not been established.

Of the two most significant parts of the invention, frictional slip preventing roughness being substantially equal to 1.0 micron, is taught in the prior art disclosure of the inventor (Hengst) and in that of (Inaba). Both teach a ceramic coating, also. The only difference between these teachings and the invention is the claimed thickness of the ceramic coating being substantially greater than or equal to 30 micron. As discussed above, the actual thickness should provide adequate protection without being too thick. Lu discloses a thickness of less than 100 micron.

In view of the foregoing, when all of the evidence is considered, the totality of the rebuttal evidence of nonobviousness fails to outweigh the evidence of obviousness.

### *Conclusion*

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571 272 1439. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

RK

  
GREGORY MILLS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700